

CLAIMS

What is claimed is:

1. A method of making a rigid polyurethane foam, comprising mixing a polyisocyanate component with a polyol component in the presence of at least one catalyst for the reaction of a polyol or water with a polyisocyanate and subjecting the mixture to conditions sufficient to cure to form a polyurethane foam, wherein (a) the polyisocyanate component contains an isocyanate-terminated prepolymer made by reacting an excess of an organic polyisocyanate with (i) at least one polyol and (ii) at least one hydroxy-functional acrylate, (b) the polyol component contains an effective amount of a blowing agent and isocyanate-reactive materials that include at least one hydrophobic polyol selected from the group consisting of castor oil, soybean oil, and combinations thereof; and (c) the ratio of isocyanate groups in the polyisocyanate component to the number of isocyanate-reactive groups in the polyol component is less than 1:1.
2. The invention according to claim 1, wherein the polyurethane foam has a bulk density in the range of about 2 to about 40 pounds per cubic foot.
3. The invention according to claim 1, wherein the volume ratio of the polyisocyanate component to polyol component is about 1:1.
4. The invention according to claim 1, wherein the hydroxy-functional acrylate is a methacrylate.

5. The invention according to claim 1, wherein at least one polyol in the polyol component contains a tertiary amine group.

6. The invention according to claim 1, wherein the catalyst includes a reactive amine catalyst.

7. The invention according to claim 1, wherein the blowing agent is water or a chemical blowing agent that releases CO₂.

8. The invention according to claim 1, wherein the organic polyisocyanate is MDI or a polymeric MDI.

9. The invention according to claim 1, wherein the foam is formed into an automotive component.

10. A rigid polyurethane foam formed by mixing a polyisocyanate component with a polyol component in the presence of at least one catalyst for the reaction of a polyol or water with a polyisocyanate and subjecting the mixture to conditions sufficient to cure to form a polyurethane foam, wherein (a) the polyisocyanate component contains an isocyanate-terminated prepolymer made by reacting an excess of an organic polyisocyanate with (i) at least one polyol and (ii) at least one hydroxy-functional acrylate, (b) the polyol component contains an effective amount of a blowing agent and isocyanate-reactive materials that include at least one hydrophobic polyol selected from

the group consisting of castor oil, soybean oil, and combinations thereof; and (c) the ratio of isocyanate groups in the polyisocyanate component to the number of isocyanate-reactive groups in the polyol component is less than 1:1.

11. The invention according to claim 10, wherein the polyurethane foam has a bulk density in the range of about 2 to about 40 pounds per cubic foot.

12. The invention according to claim 10, wherein the volume ratio of the polyisocyanate component to polyol component is about 1:1.

13. The invention according to claim 10, wherein the hydroxy-functional acrylate is a methacrylate.

14. The invention according to claim 10, wherein at least one polyol in the polyol component contains a tertiary amine group.

15. The invention according to claim 10, wherein the catalyst includes a reactive amine catalyst.

16. The invention according to claim 10, wherein the blowing agent is water or a chemical blowing agent that releases CO₂.

17. The invention according to claim 10, wherein the organic polyisocyanate is MDI or a polymeric MDI.

18. The invention according to claim 10, wherein the foam is formed into an automotive component.

19. A rigid polyurethane foam formed by mixing a polyisocyanate component with a polyol component in the presence of at least one catalyst for the reaction of a polyol or water with a polyisocyanate and subjecting the mixture to conditions sufficient to cure to form a polyurethane foam having a bulk density in the range of about 2 to about 40 pounds per cubic foot, wherein (a) the polyisocyanate component contains an isocyanate-terminated prepolymer made by reacting an excess of an organic polyisocyanate with (i) at least one polyol and (ii) at least one hydroxy-functional acrylate, (b) the polyol component contains an effective amount of a blowing agent and isocyanate-reactive materials that include at least one hydrophobic polyol selected from the group consisting of castor oil, soybean oil, and combinations thereof; and (c) the ratio of isocyanate groups in the polyisocyanate component to the number of isocyanate-reactive groups in the polyol component is less than 1:1, wherein the volume ratio of the polyisocyanate component to polyol component is about 1:1.

20. The invention according to claim 19, wherein the hydroxy-functional acrylate is a methacrylate.

21. The invention according to claim 19, wherein at least one polyol in the polyol component contains a tertiary amine group.

22. The invention according to claim 19, wherein the catalyst includes a reactive amine catalyst.

23. The invention according to claim 19, wherein the blowing agent is water or a chemical blowing agent that releases CO₂.

24. The invention according to claim 19, wherein the organic polyisocyanate is MDI or a polymeric MDI.

25. The invention according to claim 19, wherein the foam is formed into an automotive component.

26. A method of making a rigid polyurethane foam, comprising mixing a polyisocyanate component with a polyol component in the presence of at least one catalyst for the reaction of a polyol or water with a polyisocyanate and subjecting the mixture to conditions sufficient to cure to form a polyurethane foam, wherein (a) the polyisocyanate component contains at least one non-reactive hydrocarbon, (b) the polyol component contains an effective amount of a blowing agent and isocyanate-reactive materials that include at least one hydrophobic polyol selected from the group consisting of castor oil, soybean oil, and combinations thereof; and (c) the ratio of

isocyanate groups in the polyisocyanate component to the number of isocyanate-reactive groups in the polyol component is less than 1:1.

27. The invention according to claim 26, wherein the non-reactive hydrocarbon is a paraffin-containing material.

28. The invention according to claim 26, wherein the non-reactive hydrocarbon is a chlorinated paraffin-containing material.

29. The invention according to claim 26, wherein the polyurethane foam has a bulk density in the range of about 2 to about 40 pounds per cubic foot.

30. The invention according to claim 26, wherein the volume ratio of the polyisocyanate component to polyol component is about 1:1.

31. The invention according to claim 26, wherein at least one polyol in the polyol component contains a tertiary amine group.

32. The invention according to claim 26, wherein the blowing agent is water or a chemical blowing agent that releases CO₂.

33. The invention according to claim 26, wherein the foam is formed into an automotive component.

34. A rigid polyurethane foam formed by mixing a polyisocyanate component with a polyol component in the presence of at least one catalyst for the reaction of a polyol or water with a polyisocyanate and subjecting the mixture to conditions sufficient to cure to form a polyurethane foam, wherein (a) the polyisocyanate component contains at least one non-reactive hydrocarbon, (b) the polyol component contains an effective amount of a blowing agent and isocyanate-reactive materials that include at least one hydrophobic polyol selected from the group consisting of castor oil, soybean oil, and combinations thereof; and (c) the ratio of isocyanate groups in the polyisocyanate component to the number of isocyanate-reactive groups in the polyol component is less than 1:1.

35. The invention according to claim 34, wherein the non-reactive hydrocarbon is a paraffin-containing material.

36. The invention according to claim 34, wherein the non-reactive hydrocarbon is a chlorinated paraffin-containing material.

37. The invention according to claim 34, wherein the polyurethane foam has a bulk density in the range of about 2 to about 40 pounds per cubic foot.

38. The invention according to claim 34, wherein the volume ratio of the polyisocyanate component to polyol component is about 1:1.

39. The invention according to claim 34, wherein at least one polyol in the polyol component contains a tertiary amine group.

40. The invention according to claim 34, wherein the blowing agent is water or a chemical blowing agent that releases CO₂.

41. The invention according to claim 34, wherein the foam is formed into an automotive component.

42. A rigid polyurethane foam formed by mixing a polyisocyanate component with a polyol component in the presence of at least one catalyst for the reaction of a polyol or water with a polyisocyanate and subjecting the mixture to conditions sufficient to cure to form a polyurethane foam having a bulk density in the range of about 2 to about 40 pounds per cubic foot, wherein (a) the polyisocyanate component contains at least one non-reactive hydrocarbon, (b) the polyol component contains an effective amount of a blowing agent and isocyanate-reactive materials that include at least one hydrophobic polyol selected from the group consisting of castor oil, soybean oil, and combinations thereof; and (c) the ratio of isocyanate groups in the polyisocyanate component to the number of isocyanate-reactive groups in the polyol component is less than 1:1, wherein the volume ratio of the polyisocyanate component to polyol component is about 1:1.

43. The invention according to claim 42, wherein the non-reactive hydrocarbon is a paraffin-containing material.

44. The invention according to claim 42, wherein the non-reactive hydrocarbon is a chlorinated paraffin-containing material.

45. The invention according to claim 42, wherein at least one polyol in the polyol component contains a tertiary amine group.

46. The invention according to claim 42, wherein the blowing agent is water or a chemical blowing agent that releases CO₂.

47. The invention according to claim 42, wherein the foam is formed into an automotive component.